Situating Gaming as a Sonic Experience: The acoustic ecology of First-Person Shooters

Mark Grimshaw
School of Art & Design,
University of Wolverhampton
United Kingdom
mark.grimshaw@wlv.ac.uk

Gareth Schott
Department of Screen and Media Studies
University of Waikato
New Zealand
g.schott@waikato.ac.nz

ABSTRACT
To date, little has been written on digital game sound as Games Studies has almost exclusively treated and discussed digital games as a visual medium. This paper explores how sound possesses the ability to create perceptions of a variety of spaces within the game world, thus constituting a significant contributing factor to player immersion. Focusing on First-Person Shooters (FPS), we argue that player(s) and soundscape(s), and the relationships between them, may be usefully construed and conceptualized as an acoustic ecology. An argument is presented that, even though its sonic palette may be smaller, the FPS acoustic ecology emulates real world ecologies as players form a vital component in its construction and maintenance. The process of building a conceptual framework for understanding and testing the function of game sound as an acoustic ecology is broadly outlined, involving the application and extension of a disparate range of media sound theories in addition to the construction of new concepts to account for the unique features of the interactive medium of FPS games.

Author Keywords
acoustic ecology, first-person shooter, conceptual language, sound taxonomy

PRELUDE
The vista that opens up in front of you is of an abbey complex comprising peaceful arched cloisters, verdant lawns, flowerbeds and trees, marble statues, stone steps and pathways that thread their way between a mix of red-tiled Mediterranean-style buildings and Gothic architecture of imposing proportions all set against the backdrop of a blue summer's day. Birds twitter in the background and, to your right, someone is playing a Bach fugue on a church organ. Other members of your platoon cluster around you and over the radio comes the message *Follow me!* with others responding *Affirmative!* You decide to follow the organ music discovering that it emanates from a Gothic church with buttressed superstructure. In the distance, the sharp crack of gunfire and the dull thud of explosions catch your attention. Eager to join the fray, the metronomic rhythm of your running boots on the hard surface of the path is soon matched by the sound of your panting breath; this quickly overtakes the pace of your slowing footsteps so you decide to take a breather and slow to a walk. Soon the organ music is left behind and the cacophony of battle intensifies. Suddenly, a siren indicates that a platoon member has managed to steal the enemy's flag and, amidst the sharp staccato of machine gun fire, you see and hear him weaving and running towards you, flag in hand, hotly pursued by a posse of enemy soldiers. Quickly switching weapons, you lob a few grenades behind him, hearing their clattering skittering on the hard surface of the path, and immediately switch back to your trusty SPAS shotgun. A booming grenade explosion accounts for some of the enemy but more are upon you. Your flag carrier slows to a crawl, as he groans in pain frantically radioing *Medic!* leaving a trail of blood behind him…

INTRODUCTION
Game Studies has, at best, been woefully coy about sound in game environments or, at worst, completely ignored it. Statements such as "the only thing the player knows about the world of the game is what is displayed on the screen" [20] may be valid for certain types of digital games, but ignore the important role that sound plays in many other digital game genres, particularly FPS games. Indeed, given the perceptual restrictions of the first-person perspective, if players or teams are to survive and win, they must be attentive to (and learn the meaning of) its sonic cues. In contrast to the image of the game environment that fakes 3-dimensionality [4], sound is an omni-directional experience, capable of carrying information about virtual materials and dimensions of the game environment both on-screen and off-screen. Thus, it is our contention that sound is a key contributing factor to the creation of the 3-dimensionality of FPS game worlds and the immersion of players within them.

Players come to understand and utilize the relationships between themselves and the game world in order to successfully partake in the game. We argue that a significant channel through which this understanding takes place in FPS games occurs through sound. For example, deriving the cause or nature of a sound is a necessity, as is

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using sound to contextualize oneself and the role of sound as feedback for operant behaviors (panting breaths is a good indicator of the player's energy level in some FPS games) is no less important. The nature of FPS games is such that the player is placed in the position of the hunter or the hunted where both visual and auditory systems must be on the highest alert for, or, in perceptual terms, must give the greatest attention to, the slightest of cues or affordances from the game environment.

FPS games contain responsive relationships between player and the game engine (and other players in multiplayer games) that are oft expressed and mediated through sound. We therefore present an argument that conceptualization of the function and role of sound within FPS games is best expressed as an acoustic ecology in which the player is an integral and contributing component. In utilizing the term ecology, we therefore presuppose the notion that there is a web of interactions occurring at a sonic level. Indeed, the term is used to account for a space that is neither fixed nor static, but constantly changing as players respond to sounds from other players (or computer-generated characters) with their own actions, thereby contributing additional sounds to the acoustic ecology and potentially providing new meaning to, and eliciting further responses from, other players. It also accounts for other responsive relationships in which players respond to sounds produced by the game engine while the game engine itself produces sounds in response to player actions. Thus, all sound-producing game objects and events are perceived as contributing components to its acoustic ecology.

Approaches to Game Sound

Irrespective of the boundary work [8] completed by many Game Studies scholars at its inception, the study of digital games has, in many ways, taken a course that mirrors that of Film Studies both in the areas that are studied (audiences, violence, narrative, spectacle, film as film or game as game) but also in its dealings with sound. As with cinema, interest in the topic of sound in digital games has only occurred with developments in the production of sound, characterized, for example, by improvements in the digital synthesis and recording of sound married to advances in consumer electronics such as increased computer processing power and memory and a proliferation of multiple audio channels. While the console on which *Pong* [2] was originally played utilized a monophonic beep; by comparison, the XBox boasts the capacity for 256 simultaneous 2D sounds and 64 simultaneous 3D sounds (that are processed for positional and locational purposes) in addition to five digital signal processors, two of which are capable of real-time processing of sound [7].

Although the game industry has been quick to exploit increased graphics capabilities to create often stunning virtual, visual environments, they remain leery of exploiting the potential of audio technology other than as a bit-part player to the visual star. As an example, the back-of-the-box marketing for *Doom 3* stresses the manner in which "incredible graphics, and revolutionary technology combine to draw you into the most frightening and gripping first person gaming experience ever created" [15]. This emphasis on the visual at the expense of the auditory is paralleled by many Games Studies scholars who, typically in discussions of the commonalities between film and computer games, lavish considerable effort on the visual image but neglect to mention sound [17] and likewise in discussions of the construction of narrative or other forms of space and place [21].

Efforts to conceptualize game sound have nevertheless been taken within Game Studies with the creation of a handful of sound taxonomies. The work of Friberg and Gärdenfors [13], Stockburger [27] and Folmann [12] have, for example, followed similar phenomenological or technological themes focusing attention mainly on the means of production of sound or, more usually, their organization within the game code (for example, distinguishing between character or interface sounds). Where the mode of production holds relevance for the present research is its implications for the efficacy and believability of the game space and players' perception of immersion and participation within it. Conceptualization of an FPS game acoustic ecology is governed by the technical possibilities of, and limitations imposed by the design and development process. Ultimately, no digital storage medium is (nor is likely to be for some time) capable of meeting the requirements of a real-world acoustic ecology.

In an attempt to further expand the foundational beginnings of digital game sound theory, a multi-disciplinary approach was employed to conceptualize players' sonic experiences within FPS gamescapes. Existing discussions have shown a tendency to utilize and expand upon conceptual approaches and terminology derived from film sound. While it is recognized that film theory is a useful starting point due to the similarities that exist between the two media, there are also significant differences which mean over-reliance or extension of "one theory too far, into a domain for which it was never meant, does no one a service" [19]. In order to furnish the conceptual tools required to more fully investigate the role of sound and player, research fields beyond film sound theory were therefore employed and assessed for their applicability to the acoustic ecology of FPS games.

APPLYING A MULTI-DISCIPLINARY APPROACH TO GAME SOUND

The conceptual framework introduced broadly in this paper is primarily derived from, and applied to the multiplayer version of FPS games and comprises both a conceptual language and a taxonomy of game sound. A large range of concepts were examined for their relevance to the notion of a FPS acoustic ecology and adjusted accordingly where existing terminology proved insufficient. In other cases, the uniqueness of FPS game texts and the acoustic ecology demands new theoretical concepts where none currently

exist. This paper serves to introduce some of the key elements of the conceptual framework.

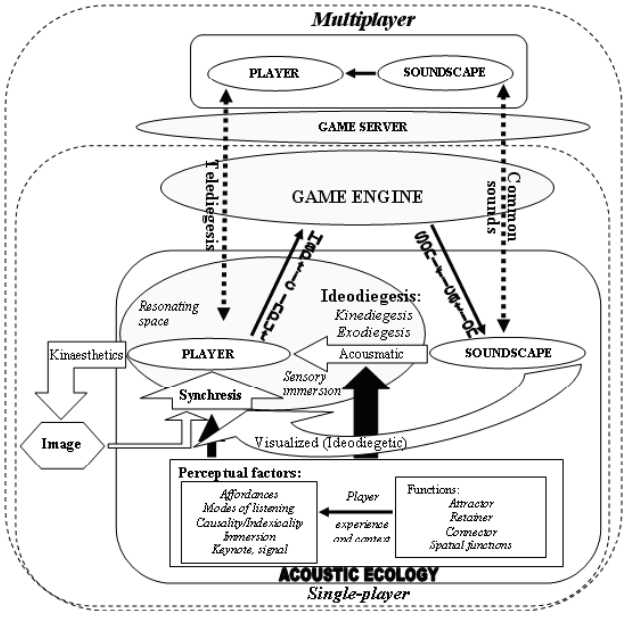

Figure 1: Conceptual framework outlining an FPS acoustic ecology.

Figure 1 outlines a broad and conceptually complex model that attempts to *begin* synthesizing the relationships between player (listener) and soundscape within FPS games. The inclusion of the game engine within the model acknowledges the game sound designer by including not only methods of sound production and design but also the organization of audio samples. We elected to treat audio samples as *auditory icons* in order to acknowledge how meaning is encoded in sound with the construction of a sound object that is sounded whenever a particular event occurs in the digital system of which it forms part. Auditory icons can, therefore, range from sounds that are similar to real-world analogues of the digital action to more abstract icons. The former often require socio-cultural knowledge or experience of the real-world equivalent, while the latter require prior experience of the auditory icon in context.

In *Quake III Arena* [16], applying Gaver [14], we find *symbolic* auditory icons (an arbitrary mapping between sound data and its representation) connected to the non-diegetic menu interface, or as a diegetic indication of the status of the two flags in the capture the flag configuration. Thus, when a flag has been taken, is dropped or has been returned to its base, these actions are accompanied by a sound like an electric guitar power chord. There are likewise *metaphorical* auditory icons in which the sound holds structural similarities to the fantasy object or event depicted, such as the sound of the personal teleporter in action. The majority of sounds in a game like *Urban Terror* [26] however, are *representational* or *causal* auditory icons having either a one-to-one mapping or at least displaying some aspect of caricature in which salient features of the object or action being represented are emphasized at the expense of others. In FPS games that attempt a more all-encompassing illusion of reality, such as *Battlefield 1942* [9] or *Urban Terror*, there are very few, if any, in-game symbolic or metaphorical auditory icons. Even the auditory representation of a sinking ship in *Battlefield 1942*, a difficult and impractical sound to record, is convincingly represented by a caricature auditory icon consisting of the sounds of a large metal object under stress. The proportion of causal sounds to non-causal sounds can therefore, be used to assess the degree of the simulation of reality within a FPS game.

While auditory icons may be classified as diegetic or non-diegetic, the position of the player in the FPS game and their ability to respond to and contribute to the soundscape required the classification of diegetic audio samples to be further refined beyond those normally found in Film Theory [6]. Thus, we propose the terms *ideodiegetic* and *telediegetic*, the former being those immediate sounds which a player hears and the latter referring to sounds produced by other players but having consequence for the one player (they are telediegetic for that player). Ideodiegetic sounds may be further categorized as *kinediegetic* (sounds triggered by the player's actions) and *exodiegetic* (all other ideodiegetic sounds).

Immersion

Another significant component of the conceptual framework is represented by the presence and role of *sonification* in the creation of both the soundscape of the acoustic ecology and the sonic, relational framework within which the player operates. Sonification theories [18] provided techniques for assessing how non-audio data, such as gameplay events and player haptic input, are expressed in sound and, therefore, provide a means to map such actions to the meaning that players perceive in sound. Sonification is therefore predicated upon sounds that are played and processed in response to player action. However, as Fencott [11] suggests, the accurate representation of real world sounds within virtual environments, holds less importance than the audiation and visualization processes players undergo, because immersion is a mental construct resulting from perception rather than sensation.

In the case of an environment sound, for example, the Bach organ fugue in the *Abbey* level of *Urban Terror* (see prelude), the ideodiegetic hearing of the sound and atmospheres in the acoustic ecology requires a discerning subject to be present [3]. Furthermore, the action of the player has an affect upon sonification because it is possible,

as Stockburger states, to exercise kinaesthetic control over that sound by the movement of a character in relation to the position of the sound source. By moving a certain distance away from the church, the sound is attenuated until the point at which it ceases to play. In technical terms, the game engine tracks the character's position within the virtual volume of the game world in relation to the sound source and decreases the volume of the audio sample until it is stopped altogether. By the simple act of fading the sound's volume (this also works in reverse), this form of sonification provides a relational framework for the player to begin to contextualize themselves within the acoustic spaces of the acoustic ecology. Sonification thus increases the immersiveness of the gameplay experience by furnishing the player's acoustic ecology with a range of perceptual hooks relating to the spatial parameters of the game world.

Perception

Developing Fencott's ideas, McMahan provides three categories of game elements effecting immersion [22]. Accordingly, FPS sounds may be described as being perceptual sureties or surprises. The former are mundane, expected cues (for example, the sound of weapons fire when a gun is fired conforms to the game genre and player expectation) whilst the latter may be sub-divided into three types. Attractors invite the player to do something, connectors aid in player orientation and retainers encourage the player to linger in a particular location. Given the fast-paced nature of FPS games, it is likely that experienced players will not prioritize retaining sounds in any hierarchical category of sonic affordances used while playing the game.

Modes of listening are utilized for various sounds within the game. In terms of how an audience listens to film sound, Chion suggests three modes of listening (derived originally from electro-acoustic music theory): causal listening, where the listener attempts to gather information about the sound source; semantic listening, where the listener utilizes a (semiotic) code to interpret (the meaning of) the sound, and reduced listening, where the listener perceives and appreciates the sound *sui generis* without reference to cause or meaning. While it is unlikely that any FPS player consciously listens for aesthetic pleasure to the structure and grain of the sound (any who do, do not survive long in the game world), it would make sense to argue, as Stockburger does, that causal listening, and particularly semantic listening, are of more importance to players of FPS games who depend on initially causally determinable audio cues to semantically distinguish threat from death-dealing opportunity, all the more so when the sound is acousmatic.

We propose a fourth mode of listening: *navigational listening*. Sound theorists from the *musique concrète* and cinematic traditions have no use for the concept of using a sound for orientation in a 3-dimensional environment. Listening to recorded music or watching a film is an activity lacking in much physical, haptic interactivity; in neither case is it typically possible for the listener to move within the musical or cinematic environment following a sound to its apparent source. *Localization* or directionality is, however, designed into FPS games. Unlike the real world, where a static sound source can be located by moving our heads or our bodies in relation to it, this movement is only an illusion in FPS games. Audio beacons primarily require navigational listening on the part of the player as they navigate towards the source of the sound. Many sounds, particularly environment sounds, function as 'connectors' allowing orientation between spaces when listened to in the navigational listening mode.

In order to define the acoustic spaces of the FPS game and the functions of sound in creating such immersive spaces, we suggest using the term *resonating space* as having an affinity to real acoustic space but also accounting for the variety of virtual acoustic spaces available. This is necessary because not only are there spaces (both visual and acoustic) within the game but there is also a very real acoustic space in which the player is physically immersed. Sounds in the game having the function of defining virtual resonating spaces through depth and locational parameters, we declare to be *choraplasts*. Similarly, though, sound may also or solely function as a *topoplast* by creating the perception of a general or specific location in the game (a form of paraspace as defined by Parkes and Thrift [24]). Time is integral to sound and provides the perception of temporal movement (which may be real-world time or game world time) and so sounds with this function may be described as *chronoplasts*. Similarly, sound functioning as an *aionoplast* provides for the perception of general or specific temporal paraspaces such as the mediæval age or September 2007.

Any FPS acoustic ecology must make use of choraplasts and topoplasts and, to a lesser extent, aionoplasts as the foundations of the spatial and temporal elements of the acoustic environment that is a component of that ecology. In many cases, these are the keynote sounds, described by Schafer [25] as ubiquitous and pervasive background sounds and, therefore, environment sounds. They may well be consciously listened to by the neophyte or the analyst but they are not intended to be and usually they are not once the action gets under way and there are other sounds to attend to. Keynote sounds set the scene of each location in the game by the provision of cues indicating resonating spaces and paraspaces such as volumetric space, location and temporal period and are not usually kinediegetic sounds. This helps their subsidence into the background; the fact that players may not overtly trigger them means that they provide few affordances as to the game action and so may be safely ignored. The majority of sounds that warrant attention in FPS games sound as a result of player actions.

Subconsciously, though, such keynote sounds are the base of the acoustic ecology's soundscape, its environment,

giving it shape and depth and providing a more or less static matrix upon which signal sounds may be pricked out in patterned affordances. This Gestalt ground usually works in tandem with the image on screen (thereby forming a part of the entire game ecology). It is, in the main, the sound which gives the image body but the image which confirms the sound's material form yet both also provide some elements of resonating spaces and paraspaces. Thus, the lonely, reverberant call of a bird heard over a softly moaning wind without being in the context of an image may exist within a ghost town, a marine littoral or anywhere that is outdoors, where that bird may be found, and which has large, reflective areas. The image on screen provides the precise location to this visualization which may be in agreement with one of a number of possible scenarios which the player has visualized or may be something entirely different. If, as Bussemakers and de Haan [5] suggest, sound is processed more quickly than image, then the image on screen cross-modally confirms what the ears have already processed.

Against this sonic ground, aural figures (Schafer's signal sounds) move, inviting the player to consciously attend to and interpret their affordances. Typically, these signal sounds bear information that is germane to the game action (rather than to the game's environment). As an example, they may be speech, and this is borne out by the typical use of speech in FPS games; where it is intelligible, it is something to be consciously attended to whether it takes the form of in-game and game-provided instructions, hints to the player and game status messages or whether it takes the form of radio messages between team members. Signal sounds may also be global feedback sounds that are available to all players (the game or flag status messages, for example). Sounds that may be classed as symbolic auditory icons are also typically used as signal sounds as evidenced by a wide range of sounds, particularly power-up indicators, in *Quake III Arena*, for example. Signal sounds, though, may also be sounds, other than speech, which have a high level of virtual indexicality with their associated in-game objects and actions. Players trigger most of these virtually indexical sounds; kinediegetic character sounds, such as footsteps and gunfire, which, being biotic in their real or, if triggered by bots, virtual genesis, betray the presence of a character to other players listening. This is the function of signal sounds which are carriers of the game's action and which are agents of change in the soundscape and of relational change between players.

THE FPS ACOUSTIC ECOLOGY

The basic building blocks of a FPS acoustic ecology are the players and their soundscapes. It is important to note that these components will change with repeat playing of the same level in the same FPS game. For example, players will continue to deepen their experience of the game and its sounds with one player possessing different behaviour patterns to another, such as favouring a different set of radio messages or weapons. Furthermore, some audio samples available for use may not be used at all. An FPS game soundscape is analogous to the game's acoustic environment (that is, the sonic surroundings in which the players and bots are active). In terms of the sound events which make up an FPS soundscape each player's individual acoustic ecology results from level-specific environment sounds, game-specific status messages and other sounds triggered by either that player or by other players. Sound events which are common across some soundscapes in the game will nevertheless sound differently for each player (with the exception of global sounds such as game status messages and global ambience); typically, this is a matter of different intensities of the sound for each player but the sound may also be transformed or masked by conjunction with other sounds or processed in real-time according to the player's location within the game world. Furthermore, these common sounds, for example a player's footsteps or gunfire, which exist in the soundscape of other players and which arise from one player's actions, may have an ideodiegetic or telediegetic affect upon these other players' actions thus morphing the latter players' soundscapes and so providing new affordances to the players (potentially affecting their actions in turn).

As a component of the FPS game acoustic ecology, the soundscape, therefore, displays characteristics that betray some of the relationships between players and between players and the game engine. Furthermore, the existence of both volatile and predictable elements in the soundscape is a clue to player activity. The greater the volatility the more likely it is that such volatility is a result of increasing player action. Predictability is not only an effect of the game mode but also indicates a lower level of player activity (both on the part of one player and on the part of other players within exodiegetic hearing range of that one player). This is because environment sounds are sounded by the game engine with some degree of predictability they may continually loop or may be sounded at regular intervals and, being less likely to be masked by the sounds of frenetic player activity, they become more strongly identifiable in the soundscape. Other than environment sounds and some game status sounds, all sounds in the FPS game soundscape are predicated upon player actions and such actions have a lower degree of predictability, particularly once the game play is well under way. The soundscapes of multiple players in the same game may have elements in common and these may be global or team-based sounds or character and interactable sounds depending upon the virtual distance between players.

We would argue that the more immersive a game is, the more appropriate it is to discuss the game world in terms of an ecology and, therefore, the greater the immersive function of the game's sounds as either attractors, retainers or connectors. For any organism to have an effect on other organisms, to have an effect upon its surroundings and, in turn, to be affected by those surroundings and other organisms, the organism must be immersed in those

surroundings. The requirement to be immersed in the game to some extent, therefore, is a given when describing such a system and it may be stated that the greater the frequency and efficacy of immersive sounds, the greater the likelihood that the game's soundscapes and its players will form an acoustic ecology.

As part of its immersive sonic experience, the FPS game provides a range of kinediegetic sounds encouraging imaginative immersion [10] through character identification (these may be classed as perceptual sureties which are consistent with the logic of the FPS game). Audio beacons provide other forms of immersive experience, such as the ability to locate an enemy sniper through the locational and depth parameters of a bullet's sound. Because all sounds, other than global game-status sounds, may have localization and depth cues applied, the player is encouraged to believe that, through their character, they are operating within the illusional 3-dimensional space depicted on screen. Furthermore, the more sophisticated use of sounds such as choraplasts, topoplasts and aionoplasts aids in imaginative immersion through the provision of virtual resonating spaces and paraspaces. Lastly, the player is able to have a significant impact upon the environment, the soundscape, through the production of kinediegetic sounds.

In most FPS games players cannot change the visual, architectural environment to any great extent if at all (that is, they cannot alter the visual structures of the level displayed on the screen). Games may include the opening and shutting of doors, the operation of lifts or platforms, the smashing of glass, the destruction of some objects (such as a crate) or the picking up and discarding of various items. These are all fleeting pleasures in their effect as major structures of the architectural environment remain in place. An opened door is often automatically shut after a short time interval and a smashed window may be automatically repaired after a minute or two in preparation for the next in-game hooligan; the buildings remain, the trees remain, islands do not move or disappear. Thus, the physical, visual environment remains substantially static throughout the playing of the level and, while this environment may affect the gameplay of players, players do not in turn affect this environment.

The situation is however different when describing FPS game sound. In this case, much of the sound heard by any one player will be a result of their actions or the actions of other players (or, where sound is not heard, a result of lack of action). While there may be environment sounds that are part of the level and global feedback sounds that are not controlled by any player, there is a range of other player-initiated sounds to be heard. Depending upon the FPS game, these may be sounds of breathing, footsteps, doors opening or closing, the sound of a power-up being used, weapons fire, explosions, mechanical noises from vehicles, radio messages or sounds of pain to name but a few. Such sounds, whether they emanate from the player's character or from other characters within the game, are typically more frequent and dense (especially at points of action, compare Figures 2 and 3) than level-specific or global feedback sounds outside a player's control. Thus, where a player's environmental intervention in the form of an opened door, for example, may have a small effect upon the architectural environment, the typical density and frequency of player-initiated sounds has a major effect upon the sonic environment.

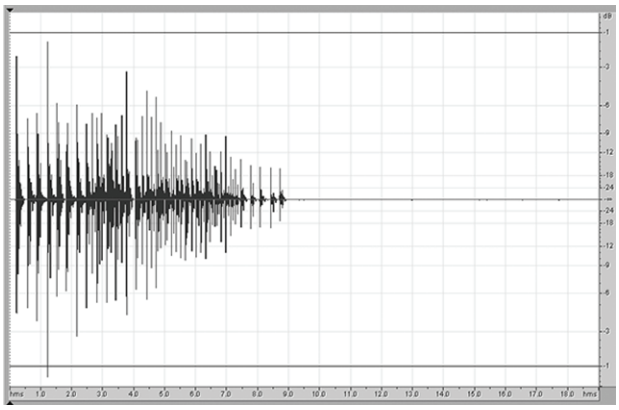

Figure 2: The sound heard by an inactive FPS player.

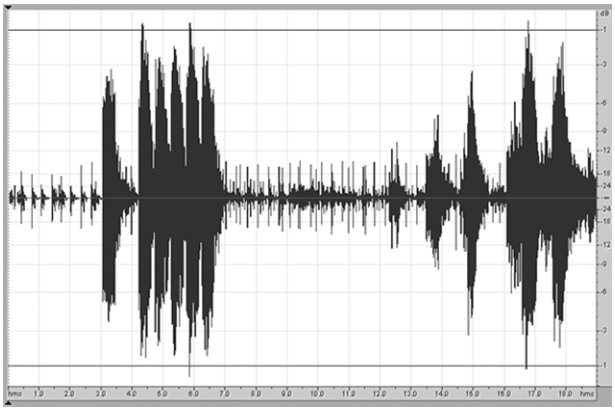

Figure 3: The sound heard by an active FPS player.

This relationship between the characters' actions and the sonic environment is not just one-way though. The sonic environment, also affects the behaviour of players (and therefore the actions of their characters) in the game and this is consistent with Schafer's view that humans in a natural ecology are shaped by the soundscape in which they live. Truax [28] defines the term acoustic community "as any soundscape in which acoustic information plays a pervasive role in the lives of the inhabitants [...] it is any

system within which acoustic information is exchanged" and it is this pervasive role which the acoustic community (the soundscape in the FPS game) plays that indicates the direction of the relationship. In this case, sound in the soundscape acts as the semantic and contextual nexus between players and between players and the game engine. In both cases, this is especially where game events are unseen and, as a significant example in a capture the flag FPS configuration, the probable reaction to the global game status sound indicating that a team's flag has been taken (and is on its way to the enemy's base) is indicative of this type of relationship.

CONCLUSION

The goal of our research was to begin constructing a conceptual framework whose primary purpose is to elucidate how sound functions as an acoustic ecology within FPS gamescapes. This allows, among other uses, for both a phenomenological and a perceptual explanation to be furnished for the immersive and relational properties of FPS sound. Future work will investigate the FPS game as an entire ecology itself and immersion in the acoustic ecology may be further explained through autopoietic principles. It is hoped that others may find the above conceptual framework and acoustic ecology model of use not only in analyzing FPS game sound but also for sound in other game genres and it is expected that the framework will undergo adaptation and expansion in order to account for other digital game paradigms.

CODA

The image displayed on the screen in front of you is synchretically combined with the real resonating space that physically envelops you as you sit in front of the computer. Within this sonified, resonating space, the visualized sounds of a virtual resonating space confirm the apparent scale and depth of the spaces represented on screen and provide other affordances. There is a world beyond the one shown. A reverberating organ indicates the resonating space and locational paraspace of a church to your right and other environment sounds inform you that you are immersed within a rural paraspace. Experience dictates that, having just entered this world, the busy character and interactable sounds that you hear all around come from your teammates as they ready themselves for battle and this is backed up by radio signals providing feedback on your team leader's intentions. Utilizing navigational listening, you kinaesthetically follow the connecting audio beacon of the organ music to its source and linger for a while enjoying the retaining qualities of the Bach fugue which reduced and semantic listening modes afford. Soon however, distant acousmatic sounds require a switch to causal listening and, discerning the sounds of a firefight, you turn to navigational listening once more and move to join the fray. The kinediegetic, exteroceptive sounds of your footsteps are quickly overshadowed by a kinediegetic, proprioceptive panting forcing you to slow to a walk as the exodiegetic sounds of battle intensify and the (by now acousmatic) organ music is kinaesthetically attenuated. While this has been occurring, in another part of the game world, a team member has darted into the enemy's base and snatched their flag and this unseen event has been signaled by an alarm. Enemy soldiers have been pursuing your plucky teammate, following the sounds of his footsteps and gunfire as he desperately weaves in and out of the abbey's cloisters. You are met by the telediegetic consequences of this when the dramatic chase appears on the screen in front of you in the form of your bleeding teammate and the frantic enemy…

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